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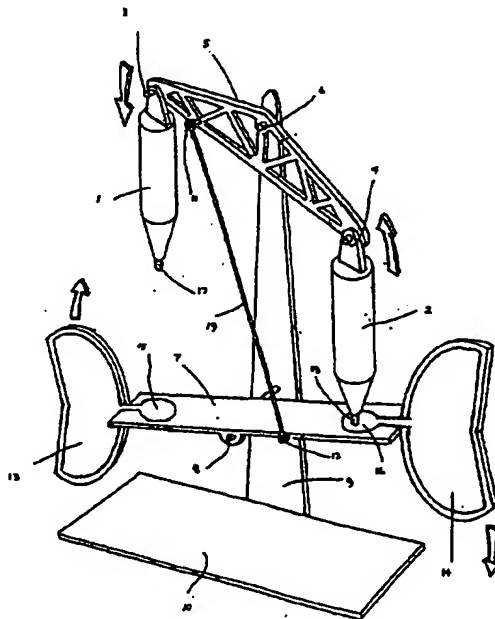
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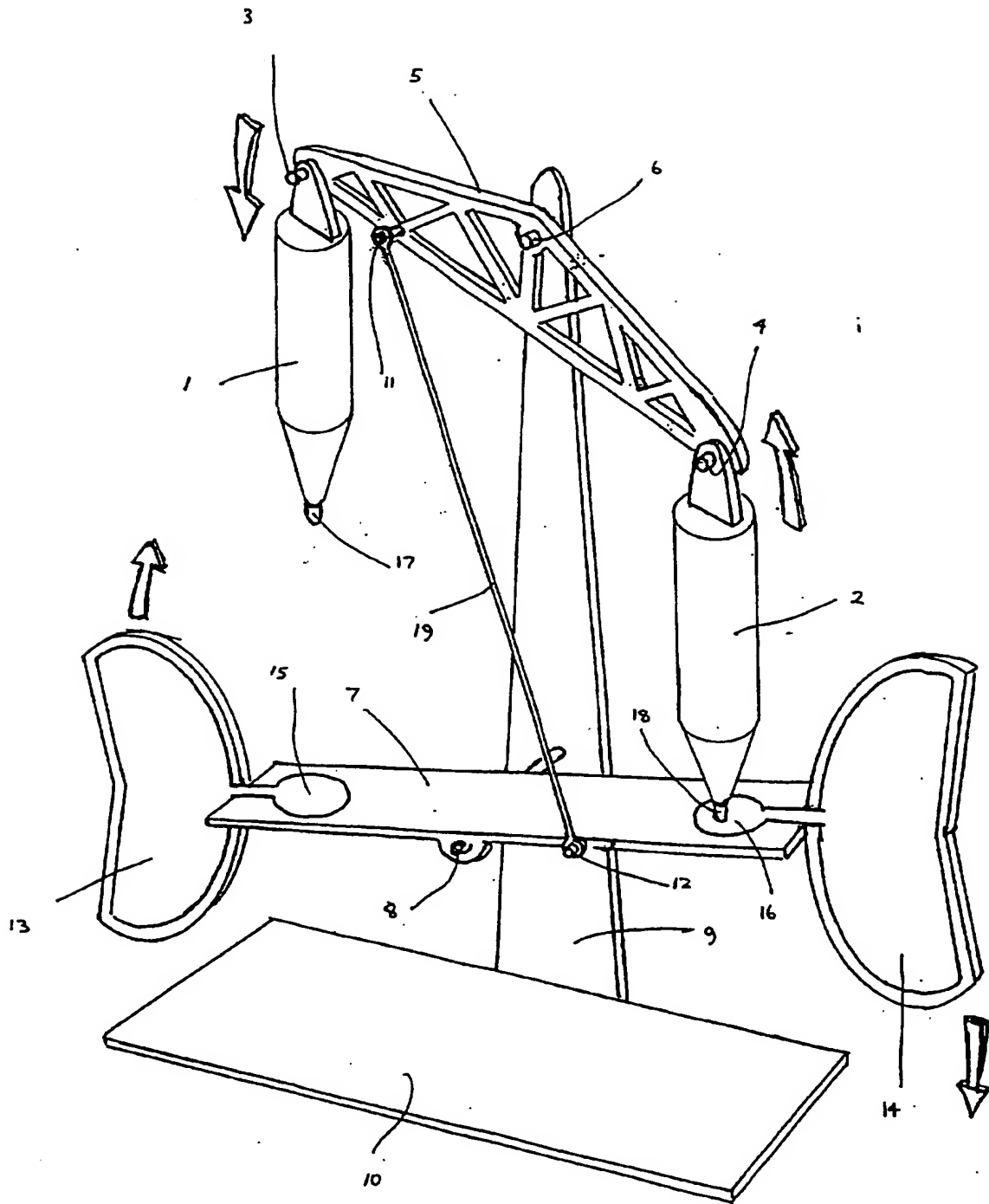
Dispenser

(57) A device for evaporating two volatile substances comprises two reservoirs 1, 2, one for each substance, each having an associated evaporation panel 13, 14. The device operates to alternate the supply of the two substances, thus preventing habituation to fragrances where these are the substances used. In the configuration shown, substance from reservoir 2 passes to surface 16 via wicking means 18. As this occurs, surface 16 becomes heavier and reservoir 2 becomes lighter until such a point that arms 5 and 7 pivot (see arrows) bringing reservoir 1 into contact with surface 15. As reservoir 1 supplies fragrance to surface 15 via wicking means 17, the substance from reservoir 2 is being evaporated via panel 14. This continues until the balance of the arms means that the device pivots again into the original configuration as shown. The evaporation panels 13, 14 may be covered (see Fig. 2) while substance is being supplied to their associated surfaces 15, 16 to enhance the effect.

Fig. 1

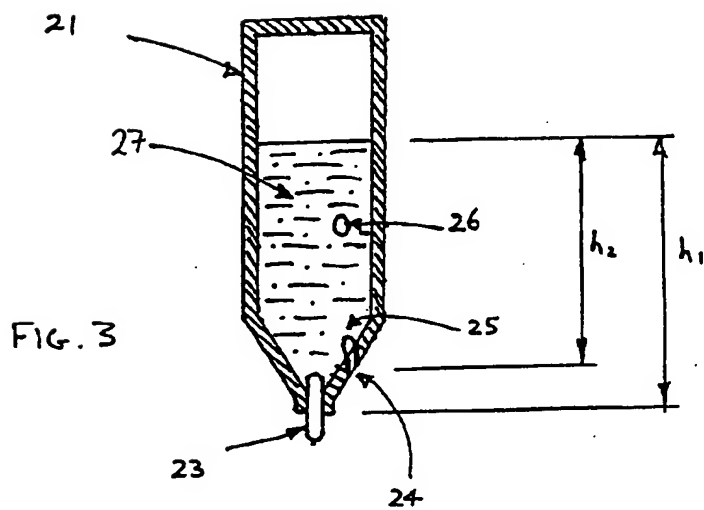
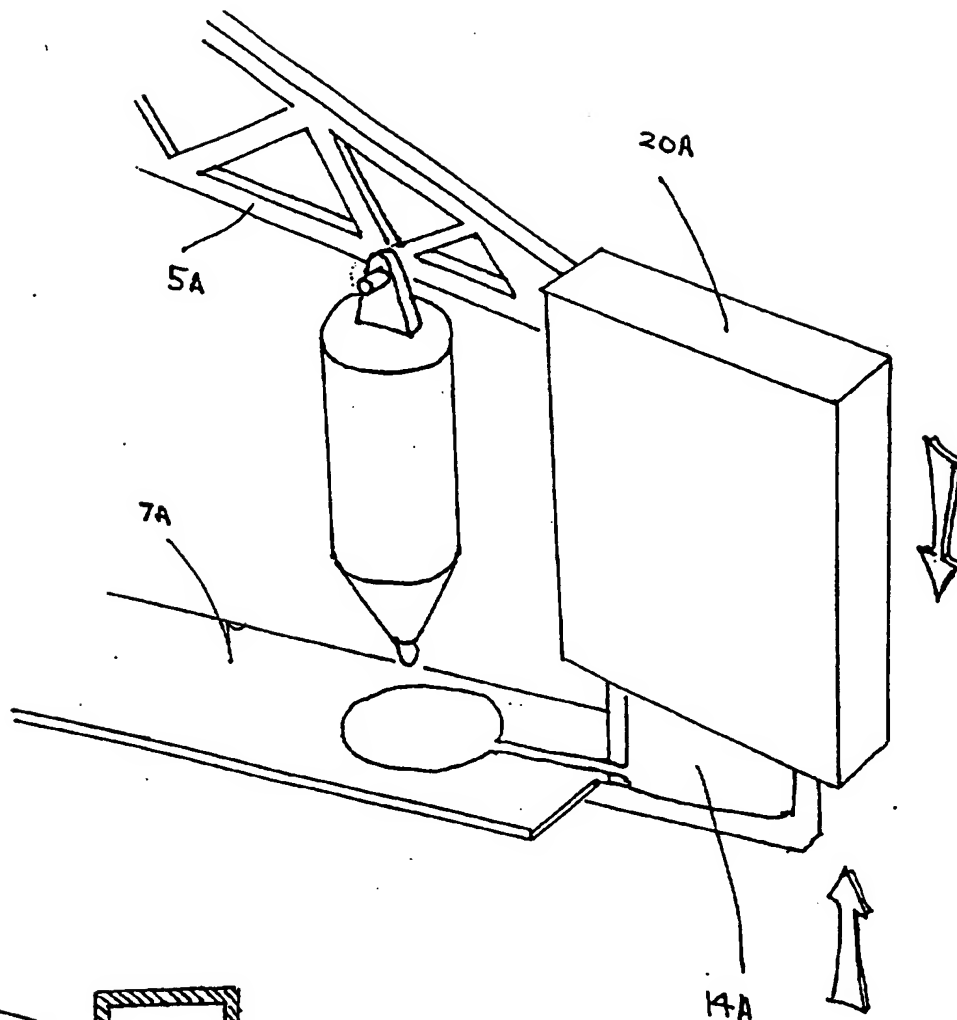


11/2
FIG. 1



2/2

FIG. 2



DISPENSER

The present invention is concerned with dispensers for chemical agents such as fragrances, odour
5 neutralisers, insect repellents and insecticides. Such dispensers are used, for instance, in domestic settings, such as in bathrooms to mask unpleasant odours, or generally to add to the ambience of a room. They typically include a reservoir of fragrance, such
10 as a liquid fragrance, and a means such as a wick for dispensing the fragrance by evaporation into the room. There also exist gel-type air fresheners where a volatile fragrance is dispersed in a gel material (which may also be subjected to heat to boost fragrance
15 release), absorbent (e.g. cellulose) pads containing liquid fragrance and aerosol air fresheners.

A problem with such dispensers is that after a time the occupant becomes used to the fragrance and no longer notices it. This is known as habituation, or
20 fragrance fatigue. It has been proposed in the past to eliminate this problem by alternating between two different fragrances so that habituation never sets in. However, hitherto no fully effective way of doing this has been found. It is therefore an object of the
25 invention to provide a device and method for alternating the dispensing of two substances.

According to one aspect of the invention there is provided a device for evaporating two substances, comprising two reservoirs, one for each respective
30 substance, means for extracting the substances from their respective reservoirs so that they can evaporate, and alternating means for changing between a configuration in which extraction is mainly from one reservoir to a configuration in which it is mainly from
35 the other, the alternation being driven by a change in weight caused by the evaporation.

The evaporation can be by means of respective evaporation surfaces able to swing between positions corresponding to the two configurations. These surfaces can be, for example, on the same support, such as a rocking arm acting as a seesaw, the upper and lower positions of one end corresponding to the two configurations. The reservoirs can be arranged suitably in relation to these exposure surfaces, coming into operative contact only in one, preferably the upper, position of the end of the seesaw. The reservoirs themselves can be also suspended on a second rocking arm preferably coupled to the first so as to, amplify the effect, as it were.

Transfer from the reservoir to the exposure surface can be by way of a wick arrangement, the reservoir preferably being otherwise sealed so that it does not drip.

In an advantageous embodiment the exposure surfaces are covered when in their "non-evaporating" position, again so as to emphasise the distinction.

The invention is also concerned with a method of dispensing substances alternately from two reservoirs, in which substance is extracted from a reservoir and evaporates until a change in weight due to the extraction or to the evaporation causes a change-over to extraction from the other reservoir.

For a better understanding of the invention embodiments of it will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows a first embodiment of the invention;
Fig. 2 shows a modification of this embodiment;
and

Fig. 3 shows a detail of a further modification.

Fig. 1 shows a stylised version of a device to overcome habituation by automatically alternating

between two different fragrance reservoirs. The device relies solely upon changes in the centre of gravity of a movable part of the device as fragrance evaporates to bring about movement of the reservoirs, thereby
5 enabling the device to change automatically from one fragrance source to another. In due course the device will revert to the original reservoir, repeating the cycle until the fragrance reservoirs are exhausted.

The two reservoirs, 1 and 2, are suspended from
10 fulcrum pivots 3 and 4 respectively so that they always hang vertically down. The pivots 3 and 4 are at the extremes of a balance arm 5 which itself pivots on a fulcrum 6. Pivoted immediately beneath the balance arm 5 is a second balance arm 7 which itself pivots on a
15 second fulcrum 8 parallel to the first.

The fulcrum points 6 and 8 are attached to a vertical support arm 9 which is held in a vertical orientation by a base 10. The upper balance arm 5 is connected to the lower balance arm 7 by a tie-rod 19
20 that freely pivots at its respective points of attachment 11 and 12 in such a way that any upward movement of the right-hand side of the lower balance arm 7 causes the left-hand side of the upper balance arm 5 to move upwards too. By the same means, as the
25 right-hand side of the balance arm 7 moves down, then the left-hand side of the balance arm 5 moves down too.

At the extremes of the lower balance arm 7 are two evaporation surfaces or pads 13 and 14 which are made from absorbent material; here the pads are supported on
30 wing-like attachments to the ends of the lower balance arm. Each pad of absorbent material 13 and 14 is in a vertical plane and extends to an inner pad 15 and 16 substantially in a horizontal plane on the lower arm 7 in such a way that the one pad 15 communicates by wick
35 action with the pad 13 and the pad 16 at the other end communicates with the other pad 14 in a similar manner.

The tips of the reservoirs 1 and 2 have wick-like protuberances 17 and 18 such that the first wick 17 remains permanently wetted by the contents of its reservoir 1 and the second wick 18 remains permanently wetted by the contents of its reservoir 2. The way in which the wicks remain permanently wetted will be described later.

The first time that the device operates, the way in which it is filled with fragrance can be made to guarantee that one reservoir is heavier than the other. This reservoir (let us say reservoir 2) will thus move its end of the balance arm 5. As it does this, the tie-rod 19 will raise the right-hand side of the lower balance arm 7 until the inner absorbent pad 16, which is currently dry, comes into contact with the wetted wick tip 18. Liquid from the reservoir 2 will then be wicked into the absorbent pad 16 and thence, by capillary action, into its appertaining evaporation surface 14.

As more and more liquid passes into the evaporation surface 14, then two things happen, namely the evaporation surface 14 becomes heavier and its reservoir 2 becomes lighter. This means that the evaporation surface 14 will cause its balance arm 7 to become heavier at its right-hand side, whilst the upper balance arm 5 is simultaneously becoming lighter on its right-hand side as the reservoir 2 becomes lighter. Since the balance arm 5 is coupled to the other balance arm 7 by the freely pivoted tie-rod 19, then any upwards movement of the right-hand end of the upper balance arm 5 will reinforce any tendency for the lower balance arm 7 to move downwards at its right-hand end as the evaporation surface 14 becomes heavier. Any such movement will cause the tip of the corresponding wick 18 to break away from its absorbent pad 16 and, if movement continues, then the wick tip 17 of the other

reservoir 1 will eventually come into contact with the corresponding absorbent surface 15 so that a similar transfer of liquid occurs on the left-hand side of the unit with liquid being transferred from the reservoir 1 to its evaporation surface 13.

The left-hand evaporation surface 13 will now start to become heavier and its reservoir 1 will become lighter. At the same time that this is occurring, the evaporation surface 14 will be becoming lighter as liquid evaporates from its surface without any form of replenishment as it is no longer in communication with its reservoir 2. Eventually, the first evaporation surface 13 will become so heavy that it outweighs the ever lightening evaporation surface 14 so that the coupled balance arms 5 and 7 will eventually move again. Thereupon the wick tip 17 breaks away from its evaporation surface 15 and, if that movement continues, the other wick tip 18 will again make contact with evaporation surface 16 and one cycle is complete. Movement and repeats of the cycle will continually occur until, eventually, the reservoirs are exhausted. Alternatively a locking device could be included to conserve the fragrance by preventing wick contact.

A much simpler device could be envisaged where the balance arm 5 for the reservoirs is permanently fixed, say in a horizontal plane, no tie-rod 19 connection occurs between the balance arms 5 and 7 and only the balance arm 7 has movement. Under such circumstances the balance arm 7 will occasionally oscillate from one side to the other as the evaporation surfaces 13 and 14 alternately become heavier. The major disadvantage with such a device is that one reservoir will inevitably tend to spend longer in contact with its corresponding absorbent surface, so that the unit gives off more fragrance from one side than the other. By building the device as illustrated in Fig. 1 the system

automatically compensates if one side tends to be more active than the other, since the coupled movement of the two balance arms 5 and 7 tends to accentuate any imbalance: both the lightening reservoir and its corresponding evaporation surface which is simultaneously getting heavier have a desire to move with combined force because of their coupling by the tie-rod 19. If one reservoir becomes significantly lighter than the other, then the heavier reservoir will automatically spend longer in contact with its absorbent surface until a degree of balance is restored.

At first sight, it may appear that any movement as one side tends to outweigh the other will rapidly be lost through friction losses in the fulcrums so that the device comes to rest with neither wick tip in contact with its corresponding absorbent pad. In practice, the meniscus that exists in the liquid that passes from the wick tip to the absorbent pad requires a certain, albeit minute, force to break apart. To provide enough force to make that break, the balance of the device must pass sufficiently from one side to the other so that once adequate force exists to break the meniscus, then the system is sufficiently imbalanced that, once movement starts, it continues until the opposite wick tip and absorbent surface come into contact.

The device described thus far will effectively lose fragrance simultaneously from both evaporation surfaces and effects such as a change in the smell of fragrance as it emanates around a room, alternating from one fragrance to the other, will largely go unnoticed. Fig. 2 illustrates the right-hand view of a modification to the device that overcomes this problem. The left-hand end of the device is modified in a similar manner. Cover component 20A is effectively a

five-sided narrow box that is open at its bottom edge, i.e. its sixth side. It is a permanently fixed extension to the balance arm 5A. In this version of the device, as the balance arm 5A moves towards the other balance arm 7A, the cover component 20A covers over the corresponding evaporation surface 14A in such a way that evaporation from its surface is significantly reduced. When the device eventually cycles so that the evaporation surface 14A moves out of the corresponding cover 20A, then the similar arrangement on the left-hand side of the device covers the left-hand evaporation surface in a similar manner.

With a device modified as in Fig. 2, then the heavier evaporation surface (which by definition is the wetter) will be fully exposed allowing fragrance to evaporate freely whilst the opposite, lighter (and drier) evaporation surface is covered. Eventually, the latter surface becomes heavier in its turn and moves out from beneath its cover. In this way, a device as shown in Fig. 2 will alternate between two different fragrances in such a way that the consumer can detect that a change has occurred.

Each reservoir effectively operates like a fountain pen or felt-tip pen, only wicking out liquid when the tip of the nib or wick is in contact with an absorbent surface. One way in which this can be achieved is shown in Fig. 3. 21 is a reservoir tube open only by two small holes in the lower reaches of its body. It contains liquid fragrance 27. The lower hole in the tube is plugged by a wick 23 along which liquid can pass by capillary flow. Slightly higher than the hole that contains the wick is a second hole 24 which acts as a vent to let air in to replace liquid that leaves via the wick. The head of liquid in the reservoir is at h1 at the bottom of the hole that contains the wick and at h2 for vent hole 24. In order

for liquid to leave via the wick 23, the air must enter the reservoir to replace it. The air enters the device by the small hole 24 but, in order to form a bubble, it must first break free from the hole. A small amount of
5 force is needed to blow a bubble in a liquid and, if the hole 24 is sufficiently small, then this force is increased. The surface tension of the liquid also affects the force that is required. By careful design, it is possible to make the force needed to blow the
10 bubble greater than the force needed for more liquid to leave the reservoir tube 21 via the wick 23. The reservoir will therefore not drip liquid from the wick 23 provided that the wick is not in contact with an absorbent surface. When the wick 23 does come into
15 contact with an absorbent surface, however, capillary action draws liquid from the wick and this action causes the capillary force to add to the pressure head difference (h_1 minus h_2), so that the force overcomes the force needed to blow a bubble at the hole 24. The
20 meniscus 25 then builds to the point where it forms a complete bubble such as the bubble 26 shown rising through the liquid 27. By this means, liquid will only leave the reservoir when the wick 23 is in contact with an absorbent surface.

25 Although the invention has been made with two different fragrances in mind, where the difference may be in terms of composition, note, strength or any combination, it is not limited to this case: the same fragrance can be used in each reservoir, the device
30 then ensuring a constancy of delivery. Moreover substances can be used which are not fragrances, for instance insect repellents.

CLAIMS

1. A device for evaporating two substances, comprising two reservoirs, one for each respective substance, means for extracting the substances from
5 their respective reservoirs so that they can evaporate, and alternating means for changing between a configuration in which extraction is mainly from one reservoir to a configuration in which it is mainly from the other, the alternation being driven by a change in
10 weight caused by the evaporation.

2. An evaporation device according to claim 1, in which the means for extracting the substances includes a contact arrangement between an evaporation
15 surface and the respective reservoirs, the contact being made and broken as the alternation takes place.

3. An evaporation device according to claim 2, in which the contact arrangement involves capillary action.

4. An evaporation device according to claim 3,
20 in which the reservoirs each have a wick and this wick makes or breaks the capillary contact.

5. An evaporation device according to claim 2, 3 or 4 and including a swinging arm, the evaporation
25 surfaces being mounted on the respective ends of the arm and the contact being made or broken as the arm swings back and forth in accordance with the amount of substance contained in its evaporation surfaces.

6. An evaporation device according to claim 5,
30 in which the arm pivots about a central horizontal axis and the evaporation surfaces are mounted on substantially vertical wings or panels at the ends of the arm.

7. An evaporation device according to any preceding claim, and including a reservoir support arm,
35 the reservoirs being mounted one at each end of end of this support arm.

8. An evaporation device according to claim 7, in which the reservoir support arm can swing between positions corresponding to the two configurations.

5 9. An evaporation device according to claims 5 and 8, in which the two swing motions are coupled.

10 10. An evaporation device according to claim 2 and further including cover means such the evaporation surface which is in contact with its reservoir is covered by the cover means while the other surface is exposed.

11. A device for evaporating two substances, comprising:

a stand;

15 two reservoirs mounted on the stand, one for each respective substance, each reservoir having a wick through which the substance can be drawn by capillary action from its respective reservoir so that the substance can evaporate,

20 a rocking arm mounted on the stand so as to be capable of swinging between two positions, and having two evaporation surfaces, each associated with one of the reservoirs;

25 wherein in one of the said positions one of the evaporation surfaces is in contact with the wick of its associated reservoir and the other surface is separated from the wick of its reservoir, and in the other position the one surface is separated from its associated wick and the other surface is in contact; and wherein the arm is caused to rock between the two
30 positions as liquid evaporates from the surface currently separated from its wick and simultaneously liquid is supplied to the surface in contact with its wick.



INVESTOR IN PEOPLE

Application No: GB 0002619.5
Claims searched: 1 to 11

Examiner: Graham S. Lynch
Date of search: 13 October 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): A5G (GV)

Int Cl (Ed.7): A61L 9/03, 9/12

Other: On-line : WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2297035 A DAVID KENNEDY. Whole document.	1.

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
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